

NON-PUBLIC?: N  
ACCESSION #: 8809300068  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Hope Creek Generating Station PAGE: 1 OF 5

DOCKET NUMBER: 05000354

TITLE: Main Turbine Trip During Weekly Surveillance Testing of the Thrust Bearing Wear Detector (TBWD) Resulting in a Reactor Scram-Equipment Failure.  
EVENT DATE: 08/26/88 LER #: 88-022-00 REPORT DATE: 09/23/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: A. Merrell TELEPHONE: 609-339-5239

COMPONENT FAILURE DESCRIPTION:  
CAUSE: B SYSTEM: TA COMPONENT: DET MANUFACTURER: G084  
B AB ECBD G084  
REPORTABLE TO NPRDS: N  
N  
SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:  
On August 26, 1988 at 1825 hours, the Plant was in OPERATIONAL CONDITION 1 (Power Operation) at 100% power generating 1100 MWe and the weekly Main Turbine Functional Test was in progress on August 26, 1988 at 1825 hours. The Thrust Bearing Wear Detector (TBWD) was being tested when a turbine trip occurred which caused a reactor trip. All control rods inserted without incident and all safety systems performed their design functions when called upon to do so. A level 8 (+54 in.) trip signal was generated and all Reactor Feedwater pumps tripped. The High Pressure Coolant Injection (HPCI) System initiated at level 2 (-38 in.) and injected for approximately 90 seconds before being secured. The "C" Feedwater pump was restarted to maintain level and the reactor was stabilized. An Unusual Event was declared and the NRC was notified. The root cause of this occurrence was a loose TBWD, drive motor switch actuating arm which prevented the drive motor runback and actuation of the trip function lockout switches, resulting in a main turbine trip. Corrective actions include the restoration of the TBWD and the "P" SRV to service, declaring the "M" SRV inoperable and planning for the restoration to service of all other equipment which was determined to have malfunctioned during this event.

End of Abstract

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## PLANT AND SYSTEM IDENTIFICATION

General Electric Boiling Water Reactor (BWR/4)  
Main Turbine System (EIS Designator:TA)

## IDENTIFICATION OF OCCURRENCE

Main Turbine Trip During Weekly Surveillance Testing of the  
Thrust Bearing Wear Detector (TBWD) Resulting in a Reactor Scram - Equipment  
Failure

Event Date: August 26, 1988

Event Time 1825 Hours

This LER was initiated by Incident Report No. 88-128

## CONDITIONS PRIOR TO OCCURRENCE

The Plant was in OPERATIONAL CONDITION 1 (Power Operation) at  
100% Power generating 1100 MWe

## DESCRIPTION OF OCCURRENCE

The weekly Main Turbine Functional Test was in progress on  
August 26, 1988 at 1825 hours. The TBWD was being tested when a turbine trip  
occurred which caused a reactor trip. All control rods inserted without  
incident and all safety systems performed their design functions when called  
upon to do so. A level 8 (+54 in.) trip signal was generated and all Reactor  
Feedwater pumps tripped. The High Pressure Coolant Injection (HPCI)  
System initiated at level 2 (-38 in.) and injected for approximately 90 seconds  
before being secured. The el c el Feedwater pump was restarted to maintain  
level and the reactor was stabilized. An Unusual Event was declared and the NRC  
was notified.

## APPARENT CAUSE OF OCCURRENCE

The root cause of this occurrence was a loose TBWD drive motor switch actuating  
arm which prevented the drive motor runback and actuation of the trip function  
lockout switches during the test, resulting in a main turbine trip.

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## ANALYSIS OF OCCURRENCE

The TBWD is a device which continuously detects the axial position of the main turbine shaft with respect to the thrust bearing casing and transmits this position signal to its pilot valve. The output of this pilot valve is used to operate electrical pressure switches which immediately close all main steam valves as soon as the wear of either of the two thrust plates exceeds approximately .020 to .030 inches. The TBWD is tested at weekly intervals from a main control room panel. The testing is accomplished by first depressing and holding a pushbutton, observing that the testing lights are lit and observing the motion of the TBWD indicator. Depressing the pushbutton actuates the turbine lockout switches and prevents the operation of the test motor runback circuit which in turn prevents an inadvertent turbine trip.

Following this event, a loose lockout switch lever arm spline clamping nut and the slightly rounded splines were discovered. A mounting screw on one of the lockout switches was also discovered to be stripped out. The Main Turbine manufacturer's representative confirmed the installation and made adjustments to ensure that the TBWD indicator will run back to the zero position when the test pushbutton is released. A caution statement was added to the TBWD functional test procedure instructing that the runback capability of the TBWD test motor be checked prior to beginning the test. The steps in the TBWD procedure were also modified to further ensure that the turbine trip bypass is functional during testing.

The Main Turbine trip resulted in a reactor pressure spike and a momentary lifting of the "H" and "M" Safety/Relief Valves (SRV). Only the "H" and "F" SRVs should have lifted since only these valves are equipped with the Low-Low Set Function for operation at 1047 psig. The "P" SRV did not lift. An investigation of the "P" SRV trip circuitry determined that the performance of a logic card was found to be defective. The card was replaced. Two gauges with "tell-tales" which monitor reactor pressure indicated that the highest pressure reached during this event was approximately 1088 psig. The design setpoint of the "M" SRV is 1108 psig and since it opened at a pressure lower than its design setpoint during this event, it was declared inoperable in accordance with Technical Specification 3.4.2.1. Although the "M" SRV has been declared administratively inoperable, the valve solenoid operating feature, indicating systems and remote shutdown function are considered functional.

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## ANALYSIS OF OCCURRENCE (CONTINUED)

A review of the Feedwater system and equipment performance during this event determined that, although a level 8 signal was generated, level 8 was not actually reached. The cause of the level 8 signal was oscillations ("ringing")

in the Feedwater system Rosemount transmitters. These transmitters are a different model than those in the safety systems where this phenomenon has been observed previously. The modification to correct the "ringing" problem in the safety systems' transmitters was not installed on the Feedwater transmitters. A design modification to correct the "ringing" problem in these Feedwater transmitters is being researched by General Electric and the system engineer.

A review of the Control Room Integrated Display System (CRIDS) sequence of events printouts for this event identified a problem pertaining to the sequence of events printout for the Alternate Rod Insertion (ARI) Division I and Division II Redundant Reactivity Control System (RRCS) initiation. The CRIDS printout for this event indicates that the two RRCS initiations occurred approximately two minutes apart rather than simultaneously. Consultation with the CRIDS vendor has established that this random time reporting problem is known to occur in computer cards of the Hope Creek revision level. The CRIDS computer group is presently procuring the upgrade kits necessary to correct this problem and will install them when received.

#### PREVIOUS OCCURRENCES

There have been no previous events in which the testing of the TBWD resulted in a turbine trip.

#### SAFETY ASSESSMENT

Had this event occurred during more severe operating conditions, the actuations and initiations which occurred would have served to mitigate any consequences of these conditions. For this reason, the health and safety of the public were not compromised by this event.

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#### REPORTABILITY

This report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

#### CORRECTIVE ACTIONS

1. The TBWD was adjusted for optimum performance and the testing procedure was modified to ensure that the turbine trip bypass is functional during testing.
2. A logic card controlling the initiation of the "P" SRV was replaced.
3. The "M" SRV setpoint was determined to be below its design value and was declared inoperable. It will be replaced at the upcoming midcycle outage.

4. A design modification of the Rosemount transmitter model used in the Feedwater level instrumentation is being being researched by General Electric and the system engineer.

5. The CRIDS computer group is presently expediting the procurement of the upgrade kits necessary to correct the random time reporting problem and will install them when received. The plant process computer group is also reviewing the revision level of all CRIDS hardware to ensure that all vendor-identified corrective upgrades have been incorporated in the Hope Creek system.

Sincerely,

J. J. Hagan  
General Manager -  
Hope Creek Operations

AM:

SORC Mtg. 88-126

ATTACHMENT 1 TO 8809300068 PAGE 1 OF 1

PSEG

Public Service Electric and Gas Company  
P.O. Box 236 Hancocks Bridge, New Jersey 08038

Nuclear Department

September 23, 1988

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION  
DOCKET NO. 50-354  
UNIT NO. 1  
LICENSEE EVENT REPORT 88-022-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

J. J. Hagan  
General Manager  
Hope Creek Operations

AM:

Attachment  
SORC Mtg. 88-126

C Distribution

\*\*\* END OF DOCUMENT \*\*\*

ACCESSION #: 8809300097

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